Questions
on lesson three

Questions signed by 📖 have been taken from the school book.

1. Choose the correct answer :

1. The chemical reaction causes .....
   a. breaking the bonds between the products and forming new bonds between the reactants.
   b. the formation of bonds between the products ,then breaking the bonds between the reactants.
   c. breaking the bonds between the molecules of reactants and forming new bonds between the molecules of the products.
   d. breaking the bonds between the products and the reactants.
2. The bright magnesium ribbon changes into a white powder of ..... when it burns in air.
   a. magnesium nitrite b. magnesium oxide
   c. magnesium hydroxide d. magnesium dioxide
3. The sum of reactants masses in any chemical reaction is ..... the sum of products masses.
   a. doubled b. more than c. equal to d. less than
4. On applying the law of constant ratios on the following reaction :

$$2Mg + O_2 \longrightarrow 2MgO$$

   We will find ..... *[knowing that : Mg = 24 and O = 16].*
   a. each 48 g (Mg) combines with 32 g (O) to form 80 g (MgO).
   b. each 24 g (Mg) combines with 16 g (O) to form 40 g (MgO).
   c. each 12 g (Mg) combines with 8 g (O) to form 20 g (MgO).
   d. (a) , (b) and (c) are correct answers.
5. If the molecule of carbon dioxide consists of one atom of carbon and two atoms of oxygen, knowing that the mass of carbon is 12 and that of oxygen is 16, so the mass of two molecules of carbon dioxide equals ..... gm.
   a. 22 b. 44 c. 88 d. 33
6. Which of the following is considered a balanced chemical equation ? .....
   a. $Mg + O_2 \longrightarrow MgO$ b. $2Mg + O_2 \longrightarrow MgO$
   c. $Mg + O_2 \longrightarrow 2MgO$ d. $2Mg + O_2 \longrightarrow 2MgO$
7. Direct combination reaction takes place between .....
   a. two nonmetals. b. a metal and a nonmetal.
   c. a compound with another. d. all of the previous answers.

8. Ammonia combines with conc. HCl producing ..... of ammonium chloride.

a. white ppt. b. brown clouds c. white clouds d. brown ppt.

9. The ..... equation verifies the law of conservation of matter.

a. $N_2 + H_2 \longrightarrow NH_3$ b. $NO + O_2 \longrightarrow NO_2$

c. $KCl + AgNO_3 \longrightarrow AgCl + KNO_3$ d. $H_2O \longrightarrow H_2 + O_2$

10. Chemical reactions are used in .....

a. medicines industry. b. fertilizers industry.

c. food industry. d. all of the previous answers.

11. Increasing the ratio of ..... gas in the atmosphere leads to increasing the air temperature.

a. carbon monoxide b. carbon dioxide c. nitric oxide d. sulphur dioxide

12. The gases that cause building corrosion are .....

a. nitrogen oxides. b. carbon oxides. c. sulphur oxides. d. both (b) and (c).

13. The gases that affect the nervous system and the eye are .....

a. nitrogen oxides. b. carbon oxides. c. sulphur oxides. d. (a) and (b).

14. All of these gases are acidic gases except .....

a. sulphur dioxide. b. sulphur trioxide. c. nitrogen oxides. d. ammonia.

15. ..... oxides are resulted during the time of lightning.

a. Carbon b. Sulphur c. Nitrogen d. (a) and (b)

16. The substances resulted from burning of coal and cellulose fibres cause .....

a. headache. b. fainting.

c. lung cancer. d. (a) , (b) and (c) are correct.

2. Choose from column (B) what suits it in column (A) :

1.

(A) Type of reaction	(B) Symbolic equation
1. Combination of a metal with a nonmetal. 2. Combination of an element with a compound. 3. Combination of a compound with another compound. 4. Combination of a nonmetal with a nonmetal.	a- $NH_3 + HCl \xrightarrow{conc.} NH_4Cl$ b- $2Mg + O_2 \xrightarrow{\Delta} 2MgO$ c- $C + O_2 \xrightarrow{\Delta} CO_2$ d- $2CO + O_2 \xrightarrow{\Delta} 2CO_2$

UNIT 1

2.

(A) Pollutant	(B) Harms
1. Carbon dioxide	a- Building corrosion.
2. Sulphur oxides	b- Nervous system irritation.
3. Nitrogen oxides	c- Occurrence of headache and fainting.
4. Carbon monoxide	d- Increasing of air temperature.

3. Put (✓) in front of the right statement and (×) in front of the wrong one, then correct it :

1. On burning a magnesium strip in the air, a black powder is formed. ( )
2. Balancing chemical equation means that the number of atoms of each element is the same in both reactants and products. ( )
3. The mass of a molecule of (NO_2) is more than the mass of a molecule of (NO). ( )
4. The reaction of magnesium and oxygen is considered a direct combination reaction between two nonmetal elements. ( )
5. When ammonia gas reacts with hydrochloric acid, white clouds of ammonium chloride are formed. ( )
6. It is possible to convert the chemical energy in some chemical reactions to heat energy or electric energy. ( )
7. Sulphur dioxide gas acts as a greenhouse effect. ( )
8. By increasing the ratio of (CO_2), the air temperature decreases. ( )
9. Carbon oxides have bad effects on the nervous system and the eye. ( )
10. Sulphur oxides and nitrogen oxides are acidic gases. ( )
11. Burning of cigarettes causes lung cancer. ( )
12. The burning reactions are considered from the chemical reactions that pollute the environment. ( )
13. Nitrogen oxides are formed during occurrence of earthquakes. ( )

4. Write the scientific term of each of the following :

1. 📖 Breaking the bonds between the molecules of the reactants and forming new bonds between the molecules of the products.
2. 📖 A set of chemical formulae and symbols expressing the reactants, the products and the reaction conditions.
3. The sum of reactants masses in any chemical reaction equals the sum of products masses.
4. The chemical compound that is formed from combination of its elements by constant weight ratios.
5. Reactions which involve combination between an element with another or a compound with another.

6. White clouds are formed on placing a glass rod wet with conc. hydrochloric acid close to the mouth of a test tube containing ammonia solution.
7. The gas which acts as a greenhouse effect.
8. Oxides that cause building corrosion.
9. Poisonous gases that affect both the eye and the nervous system.

5. Complete the following statements :

1. The chemical reaction is the ..... of the existing bonds between the atoms of the molecules in the reactants and ..... new bonds between the atoms of the molecules in the products.
2. In the reaction : $2Mg + O_2 \xrightarrow{\Delta} 2MgO$
   a. The ..... bond in an oxygen molecule is broken to give .....
   b. The magnesium atom combines with ..... atom to form ..... molecule.
3. The chemical equation is a set of ..... and ..... expressing the reactants and ..... molecules in the chemical reaction.
4. The chemical equation should be ..... to achieve the law of .....
5. If 48 gm of magnesium combines with 32 gm of oxygen, they produce ..... gm of .....
6. A compound is produced from a chemical combination of atoms of two elements or more by constant weight proportions and this is known as the law of .....
7. Combination of carbon with oxygen gives ..... gas and this reaction is considered ..... reaction.
8. When a glass rod wet with conc. hydrochloric acid is put at the mouth of a test tube containing ammonia solution, ... clouds of ..... are formed.
9. Chemical reactions are used in many industries such as manufacture of ..... , ... and .....
10. ..... , ... and ..... are among products of fuel burning.
11. Increasing the ratio of ..... gas in air leads to increasing the air temperature.
12. Carbon monoxide is a dangerous gas which causes ..... , ... and .....
13. Sulphur oxides such as ..... and ..... are acidic gases which cause building .....
14. The combination of oxygen gas with ..... compound produce ..... gas which is responsible for greenhouse phenomenon.
15. Burning of coal and cellulose fibers cause ..... pollution and .....
16. ..... oxides affect the nervous system, while ..... oxides cause respiratory system malfunction.
17. ..... oxides resulted during the time of lightning and they are from poisonous ..... gases.

6. Complete the following equations and mention the type of each reaction :

1. $2Mg + O_2 \xrightarrow{\Delta}$ ..... (.....)
2. $C + O_2 \xrightarrow{\Delta}$ ..... (.....)
3. $NH_3 + HCl \xrightarrow{Conc.}$ ..... (.....)
4. $2CO + O_2 \xrightarrow{\Delta}$ ..... (.....)
5. $2NO + O_2 \longrightarrow$ ..... (.....)

7. Give reasons for :

1. A white powder is formed when a magnesium ribbon is burned in air.
2. 🕮 A chemical equation should be balanced.
3. The mass of magnesium is increased when it is burned.
4. 🕮 White clouds are formed when ammonia gas reacts with conc. hydrochloric acid.
5. Chemical reactions play an important role in our life.
6. The use of chemical reactions is considered a double-edged weapon.
7. Burning of fuel is among the reactions that pollute the environment.
8. (CO_2) gas acts as a greenhouse effect.
9. Smoking is very harmful to health.
10. The spread of cancer tumors increases in the country that use coal as fuel.
11. Burning of coal and cellulose fibers has bad effect.
12. Carbon monoxide is a dangerous gas.
13. Sulphur oxides cause respiratory system malfunction and building corrosion.
14. Nitrogen oxides affect the nervous system and the eye.

8. Rewrite the following chemical equations after balancing them :

1. $Al + Cl_2 \longrightarrow AlCl_3$
2. $H_2 + NO \longrightarrow H_2O + N_2$
3. $Na + Cl_2 \longrightarrow NaCl$
4. $KI + Cl_2 \longrightarrow 2KCl + I_2$
5. $CO + O_2 \longrightarrow CO_2$

9. What is meant by each of the following ... ?

1. 🕮 Chemical reaction.
2. 🕮 Chemical equation.
3. The balanced chemical equation.
4. Law of conservation of matter (mass).
5. Law of constant ratios.
6. Direct combination reactions.

10. Mention the name of the chemical pollutants that cause the following harms :

1. Lung cancer.
2. Headache, fainting and severe stomach-aches.
3. Respiratory system malfunction and building corrosion.
4. Nervous system irritation and inflammation of the eye.

11. Write the chemical equation representing the following reactions, then indicate the type of each reaction :

1. Heating a magnesium ribbon in air.
2. 📖 Burning of carbon in the presence of oxygen.
3. 📖 Reaction of ammonia gas with hydrochloric acid.
4. 📖 Reaction of carbon monoxide with oxygen.

12. What happens in each of the following : [explain your answer with balanced symbolic chemical equations if it is possible] :

1. Burning a magnesium ribbon in air.
2. Approaching a wet rod with hydrochloric acid to ammonia gas.
3. Burning of a piece of coal in air.
4. The ratio of (CO_2) gas increases in air.
5. Burning of coal and cellulose fibers.

13. Mention the harms of :

1. Carbon monoxide.
2. Carbon dioxide.
3. Sulphur oxides.
4. Nitrogen oxides.

14. 📖 Indicate using symbolic and word equations, an example to the following :

1. Direct combination between an element with an element.
2. Direct combination between an element with a compound.
3. Direct combination between a compound with another compound.

15. Variant questions :

(1) 📖 Write a short paragraph on :

Burning of fuel and its harmful effects on human beings and environment.

(2) 📖 Knowing that the mass of carbon (C) is 12 and oxygen (O) is 16 :

Find the total mass of reactants and products through the following reaction :

$$C + O_2 \xrightarrow{\Delta} CO_2$$

(3) Calculate the masses of reactants and products in the following reactions :

(1) $HCl + NaOH \longrightarrow NaCl + H_2O$

(2) $S + O_2 \longrightarrow SO_2$

(Knowing that the mass of : H = 1 & O = 16 & S = 32 & Cl = 35.5 and Na = 23).

(4) From the opposite reaction : $C + O_2 \xrightarrow{\Delta} CO_2$

(1) Show how the conservation law of matter is achieved, then define it ?
[knowing that the atomic masses of : C = 12 & O = 16].

(2) What is the effect of the produced gas on the environment ?

(3) **What is the type of each of the following ?**

a. The produced oxide.

b. The chemical bond in the produced molecule.

c. The chemical reaction that is occurred.

(5) If you have the following substances :

- Conc. hydrochloric acid. - Magnesium ribbon.
- A piece of coal. - Ammonia. - Flame.

Show by balanced chemical equations only how to obtain :

(1) Metal oxide. (2) Nonmetal oxide. (3) White clouds.

(6) 🕮 One of your classmates has asked you to share him writing a report on the role of technology in chemical reactions, indicating their importance and their bad effects on the environment. What is the information you will support him with ?

(7) What is the mass of calcium nitrate produced from the reaction of 74 gm of calcium hydroxide with 126 gm of nitric acid ? Knowing that the mass of the formed water is 36 gm according to this equation :

Calcium hydroxide + Nitric acid ⟶ Calcium nitrate + Water

16. Study the following figures, then answer the following questions :

(1) From the opposite two figures, mention :

a. The type of the reaction that represents each figure [write the equation].

b. The type of the produced compound from the two reactions (1) and (2).

c. The properties of magnesium ribbon and the piece of coal [two only].

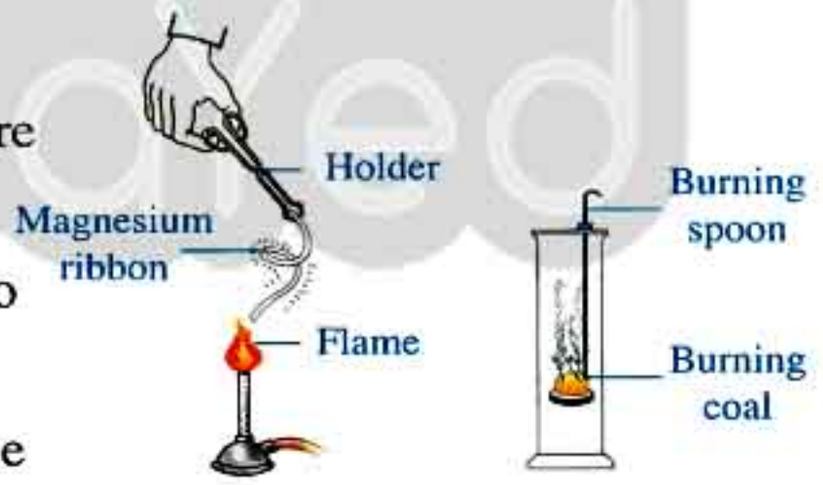


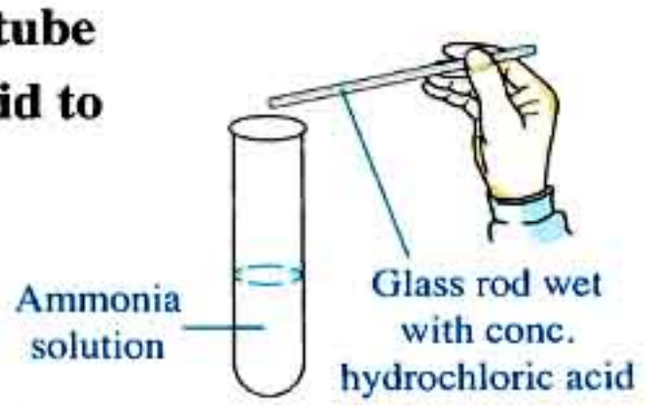
Fig. (1) Fig. (2)

(2) If you put a small amount of ammonia solution in a test tube and approach a glass rod wet with conc. hydrochloric acid to the mouth of the test tube as in the figure :

a. What do you observe ?

b. Mention the type of the reaction [write the equation].

c. What is the name and the type of the produced compound ?



1. Choose the correct answer :

1. To form 54 gm of water, it is required to react 48 gm of oxygen with 6 gm of hydrogen, so 2 gm of hydrogen combines completely with ..... gm of oxygen.

a. 12 b. 16 c. 96 d. 144

2. The ratio between the mass of reactants in the chemical reaction to the mass of products is ..... one according to the law of conservation of matter.

a. less than b. more than c. equal to d. no correct answer

3. On burning a magnesium ribbon in air, the weight of the formed white powder is ..... the weight of magnesium ribbon.

a. more than b. less than c. equal to d. no correct answer

2. Give reasons for :

1. Erosion the front of houses in the industrial areas.
2. Country prevents the passage of cars in the archaeological areas.

3. In the opposite reaction : $2Mg + O_2 \xrightarrow{\Delta} 2MgO$

48 gm of magnesium reacts with 32 gm of oxygen to form 80 gm of magnesium oxide.

How many grams of magnesium is required to form 10 gm of magnesium oxide ?

4. Study the following reaction, then answer the following questions :

$$NaOH + HCl \longrightarrow NaCl + H_2O$$

[knowing that the mass of : Na = 23 , O = 16 , H = 1 , Cl = 35.5].

(1) Choose : The resulting salt from the reaction ..... in water.

a. soluble b. insoluble c. precipitates

(2) Calculate the mass of sodium chloride resulted from the reaction of 80 gm of sodium hydroxide with a suitable amount of hydrochloric acid.

Questions
on lesson one

Questions signed by 📖 have been taken from the school book.

1. Choose the correct answer :

1. When you kick a static ball with your foot, a force acts on the ball which changes the .....
   a. direction of the motion of the ball. b. state of the ball into motion.
   c. mass of the ball. d. (a) and (b).
2. 📖 A force is an effect that .....
   a. always changes the state of an object's motion.
   b. never changes the state of an object's motion.
   c. always changes both object's position and direction.
   d. may change the state of an object's motion.
3. Fundamental forces in nature are .....
   a. gravitational forces. b. electromagnetic forces.
   c. nuclear forces. d. all of the previous forces.
4. The apple falls down due to the effect of .....
   a. electromagnetic force. b. Earth's gravitational force.
   c. weak nuclear force. d. strong nuclear force.

5. 📖 The amount of Earth's gravitational pull on the object is .....
   a. object's mass. b. object's weight.
   c. Earth's gravitational acceleration. d. centrifugal force.
6. ..... is the scientist who discovered the Earth's gravitational.
   a. Planck b. Newton c. Archimedes d. Coulomb
7. The work done to lift an object upwards increases by increasing .....
   a. object's volume. b. object's mass. c. object's density. d. no correct answer.
8. 📖 An object's weight on the Earth's surface is related to ..... forces.
   a. electromagentic b. gravitational
   c. weak nuclear d. strong nuclear
9. If the mass of an object decreases to its half, the weight .....
   a. increases to the double. b. decreases to the half.
   c. still constant. d. no correct answer.
10. 📖 Earth's gravitational acceleration is changed from a place to another on Earth's surface because of the .....
    a. objects' masses. b. Earth's mass.
    c. the distance from the Earth's centre. d. various temperatures.

UNIT 2

11. The multiplying of object's mass by Earth's gravitational acceleration equals .....
a. object's volume. b. object's mass. c. object's weight. d. no correct answer.

12. If the mass of an object is 2 kg and the Earth's gravitational acceleration is 10 m/sec^2, the object's weight equals .....
a. 0.2 newton. b. 2 newton. c. 20 kg. d. 20 newton.

13. The weight of an object is measured in .....
a. kilogram. b. coulomb. c. newton. d. m/sec^2.

14. The object's weight changes by changing its .....
a. volume. b. velocity.
c. position on Earth's surface. d. (b) and (c) together.

15. The bar used in the electromagnet is made up of .....
a. isolated copper. b. steel iron.
c. wrought iron. d. aluminium.

16. The idea of how the electromagnet works is to change .....
a. mechanical energy into electric energy.
b. electric energy into magnetic energy.
c. electric energy into mechanical energy.
d. magnetic energy into mechanical energy.

17. 📖 The electromagnet is used in making the .....
a. calculator. b. electric bell.
c. microscope. d. night vision system.

18. 📖 Electromagnetic forces affect the operation of the following except for .....
a. dynamo (electric generator). b. electric motor.
c. car internal combustion engine. d. electromagnet.

19. The ..... changes the mechanical energy into an electric energy.
a. electromagnet b. dynamo
c. electric motor d. no correct answer

20. The electric motor changes the .....
a. mechanical energy into an electric energy.
b. electric energy into a magnetic energy.
c. electric energy into a mechanical energy.
d. magnetic energy into a mechanical energy.

21. Electric motor is used in the manufacture of .....
a. radio. b. electric bell.
c. blender (mixer). d. watch.

22. The nuclear radiations used in medicine are produced from .....
a. gravitational forces. b. electromagnetic forces.
c. weak nuclear forces. d. strong nuclear forces.

23. Weak nuclear forces are used in .....
   a. producing electricity. b. scientific researches.
   c. military purposes. d. all the previous uses.
24. We can obtain electric energy from all the following except .....
   a. dynamo. b. electric motor.
   c. electric power stations. d. strong nuclear reactors.
25. Strong nuclear forces are used in .....
   a. medicine. b. industry.
   c. scientific researches. d. military purposes.
26. The idea of working the atomic bomb depends on the use of ..... forces.
   a. gravitational b. electromagnetic c. strong nuclear d. weak nuclear

2. Put (✓) or (✗) in front of the following statements and correct the wrong ones :

1. When a force acts on a moving body, the force may change its direction only. ( )
2. You can't push a wall with your hand, because the force acting on it is improper. ( )
3. Fundamental forces in nature are divided into five main kinds. ( )
4. Force is an amount of Earth's gravitational to the body. ( )
5. The exerted work to lift an object decreases by increasing the object's mass. ( )
6. The Earth's gravitational acceleration increases by approaching to the Earth's centre. ( )
7. The gravitational force of the Earth to the rocket increases as it moves away from it. ( )
8. The scientist Coulomb who discovered the Earth's gravitational. ( )
9. The weight of the object changes by changing its place on the Earth's surface. ( )
10. The mass of a person at the equator is less than its mass at the two poles. ( )
11. The gravitational force between an object and the Earth decreases as the mass of the object decreases. ( )
12. The force is measured in newton. ( )
13. Object's weight = its mass + gravitational acceleration. ( )
14. The weight of the object at the north pole is less than its weight at the equator. ( )
15. The effective point of the object's weight is at its centre of gravity. ( )
16. The electric current has a magnetic effect. ( )
17. The bar of the electromagnet is made up of copper. ( )
18. Dynamo changes the heat energy into an electric energy. ( )
19. Electric generator is used in the manufacture of washing machines. ( )
20. Strong nuclear forces are used in generating solar energy. ( )
21. Egypt seeks to use nuclear energy in producing medicine. ( )

3. Write the scientific term of each of the following :

1. The effect that attempts to change the object's state from being static to motion or vice versa or attempts to change the motion direction.
2. • The ability of the Earth to attract an object to its centre.
   • 🕮 The amount of Earth's gravitational pull on an object.
3. The effective point of the object's weight.
4. The measuring unit of the object's weight.
5. The product of multiplying object's mass by Earth's gravitational acceleration.
6. • An instrument used in making the electric winches and electric bells.
   • An instrument used to change the electric energy into a magnetic energy.
7. An instrument used to change the mechanical energy into an electric energy.
8. An instrument used to change the electric energy into a mechanical energy.
9. Forces which are responsible for getting radioactive elements and nuclear radiations.

4. Complete the following statements :

1. The book on the table remains static because there is no ..... acting on it.
2. When you kick a static ball by your foot, a ..... acts on it causing its .....
3. Force can change the ..... of motion of an object.
4. Force is an effect attempts to change the object's state from being static to ..... or vice versa or attempts to change the ..... of motion.
5. Fundamental forces in nature are divided into three divisions, which are ..... forces, ... forces and ..... forces.
6. The work done to lift an object ..... by increasing the object's mass.
7. Earth attracts the object to its ..... by a force known as the object's .....
8. The effective point of an object's ..... is located at its centre and this is known as .....
9. When an object transfers from the equator to the north pole, ... is changed , while ..... remains fixed.
10. ..... and ..... are the factors affecting the gravitational force between the Earth and the object.
11. The measuring unit of the object's mass is ....., while that of its weight is .....
12. The ..... of an object is fixed value, while its weight ..... from one place to another on the Earth's surface.
13. Object's weight = Earth's gravitational acceleration × .....
14. The weight of an object is measured in ..... unit.
15. The object's weight increases as the height from Earth's centre .....
16. If you know that the Earth's gravitational acceleration is 10 m/sec^2, the weight of an object of 3 kg mass is .....
17. The electromagnet is made up of an isolated ..... wire coiling around a bar of .....

18. Electromagnet is made by the idea of changing ..... energy into ..... energy.
19. Electromagnet is used in making ..... and .....
20. Electric generator works on changing ..... energy into ..... energy.
21. Electric motor works on changing ..... energy into ..... energy.
22. An atom stores a massive amount of energy inside its .....
23. Radioactive elements and nuclear radiations are used in ....., ... and industry.
24. Strong nuclear forces are used in producing ..... and in ..... purposes.
25. Egypt seeks to use ..... energy in producing electricity.

5. Give reasons for :

1. The pencil is still in a static phase on the desk.
2. The static ball moves when you kick it.
3. When you push a wall, it doesn't move.
4. The mass of the object remains constant by changing its position on the Earth's surface.
5. The weight of the object is always greater than its mass.
6. The weight of the object at the south pole is greater than its weight at the equator.
7. The weight of a bag of sugar equals 1 kg a phrase is scientifically not accurate.
8. 📖 Object's weight changes from one place to another on the Earth's surface.
9. 📖 Gravitational acceleration changes on Earth's surface from one place to another.
10. Electric motor is used in the manufacture of the fans and the washing machines.
11. The wrought iron attracts iron filings after putting it inside an electric coil.
12. The importance of dynamo in the case of cutting off the electric current.
13. The importance of nuclear force.

6. What is meant by ... ?

1. 📖 Force.
2. 📖 Weight.
3. 📖 An object's weight is 60 N.
4. The weight of an object, its mass 1 kg in a certain region on the Earth's surface is 9.8 newton.

7. What is the force responsible for each of the following :

1. Falling of objects towards the Earth's surface.
2. Converting the mechanical energy into an electric energy.
3. Lifting the scrap iron in factories by the electric winches.
4. The emission of some invisible radiations from radioactive elements.
5. Producing electricity from nuclear energy.

8. Explain the idea of operation of each of the following :

1. Electromagnet.
2. Electric generator (Dynamo).
3. Electric motor.

UNIT 2

9. Mention one benefit (use) of each of the following :

1. Electromagnet.
2. Electric winches.
3. Electric motor.
4. Weak nuclear force.
5. Strong nuclear force.

10. What happens when ... and why ?

1. You kick a static ball with your foot.
2. An attacker hits the moving ball with his head.
3. You push a wall with your hand.
4. The object's mass increases (relative to the object's weight).
5. Migration of a bird from the south pole to the equator (related to : the mass and the weight of the bird).
6. Approaching from Earth's centre (related to the Earth's gravitational acceleration).
7. Moving away from the centre of the Earth (according to : the mass and the weight of an object).
8. An astronaut moves from the Earth to the Moon (according to : the mass and the weight of the astronaut).
9. An electric current flows through an isolated copper wire which is coiled spirally around a plastic tube containing iron bar and approach it to iron filings.
10. Cutting off an electric current for an electromagnet lifts pieces of iron.

11. Choose the odd word out, then write the scientific name of the rest :

1. Gravitational forces / Friction forces / Nuclear forces / Electromagnetic forces.
2. Work / Mass / Weight / Earth's gravitational acceleration.
3. Electric generator / Electric motor / Electric bell / Bell handwork.

12. Compare between :

1. Mass and weight.
2. Electric generator and electric motor.
3. Strong nuclear forces and weak nuclear forces [Concerning the use].

13. Mention an activity to explain each of the following :

1. The Earth attracts objects.
2. Magnetic force of electric current.

14. Problems :

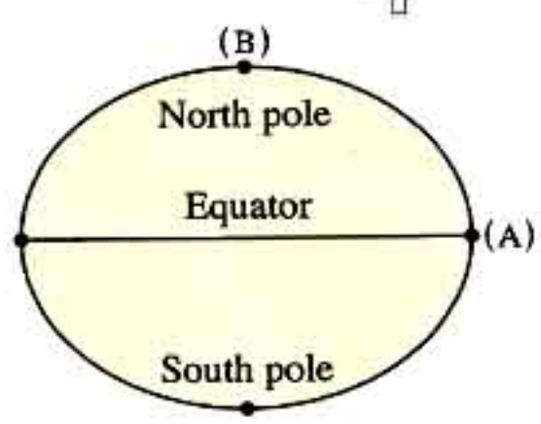
1. If the Earth's gravitational acceleration in a place is 9.8 m/sec^2, find the weight of the following :
   a. 0.3 kg mass ball.
   b. 50 kg mass boy.

2. Calculate the mass of an object if its weight is 980 newton and the Earth's gravitational acceleration is 9.8 m/sec^2.
3. An object is put near the Earth's surface and the Earth's gravitational force is 34.3 newton. Calculate :
   a. The object's weight.
   b. The object's mass. (knowing that the Earth's gravitational acceleration = 9.8 m/sec^2.)
4. The weight of an object on Mars is 32 newton and on Earth is 80 newton. What's the gravitational acceleration on Mars if the gravitational acceleration on Earth is 10 m/sec^2.

15. Various questions :

1. Mention three phenomena caused by the effect of the fundamental forces in nature.
2. Mention the main three divisions of forces in nature.
3. Mention the factors affecting the object's weight.
4. Mention the mathematical relationship that links between the weight and mass.
5. If you know that the weight of an object at the equator is less than that its weight at the south pole.
   • Mention the relation between each of the following.
   (1) The mass of the object at the south pole and its mass at the equator.
   (2) The Earth's gravitational acceleration at the equator and the south pole.
6. Explain the structure of electromagnet, and mention its uses.
7. Mention one example for an apparatus depends on electromagnetic force in its working.
8. Mention the uses of nuclear forces (weak and strong).
9. In the opposite figure, some paper clips are attracted to the nail. Explain the reason for this attraction.

10. From the opposite figure, answer the following questions :
    (1) Why is the weight of objects different at the equator from its weight at the two poles ?
    (2) What happens to the weight of an object when it transfers from point (A) to point (B) ? [Give a reason]



11. What is the input energy and output energy in the following devices ?
    (1) Electric motor.
    (2) Electric generator.

1. Choose :

1. The ratio between the mass of an object at two poles to its mass at the equator is ..... one.

a. more than b. less than c. equal to

2. If you have two objects (A) & (B), the weight of object (A) is doubled the weight of object (B) and the mass of object (B) equals 4 kg, so the weight of object (A) = ... newton.
[knowing that the Earth's gravitational acceleration = 10 m/sec^2.]

a. 20 b. 40 c. 80

2. Problems :

1. If you have two objects (A) & (B), the mass of object (A) is doubled the mass of object (B) and the weight of object (B) equals 400 newton. Calculate the mass of object (A).
[knowing that the Earth's gravitational acceleration = 10 m/sec^2.].

2. An object, whose weight is 36 newton on Earth's surface and 6 newton on Moon's surface. Calculate the ratio between the gravitational acceleration on the surface of the Moon and Earth.

3. An object, whose mass is 30 kg on the surface of the Moon. Calculate its weight on :
(1) Earth's surface. (2) Moon's surface.
[knowing that the gravity of Moon equals $\frac{1}{6}$ the gravity of Earth and Earth's gravitational acceleration = 9.8 m/sec^2.].

4. Calculate the gravitational acceleration on the surface of Uranus planet if the weight of an object in there equals 200 newton and its mass on Earth's surface equals 26 kg.

5. A 100 kg rocket was shot vertically upward, the rocket hit a target and lost three quarters of its mass and fell to the ground. Compare between the weight of the rocket before and after shooting.

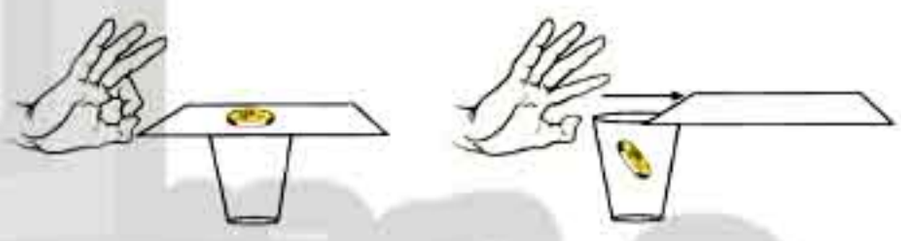
Questions

on lesson two

Questions signed by 📖 have been taken from the school book.

1. Choose the correct answer :

1. All of the following are accompanied forces to motion except .....
   a. friction force. b. gravitational force.
   c. force of inertia. d. forces inside living systems.
2. 📖 The inertia force affects the ..... objects.
   a. moving b. static
   c. moving and static d. no correct answer
3. The coin falls in the cup by a rapid hitting of the paper is an application of .....
   a. force of inertia.
   b. friction force.
   c. gravitational force.
   d. centrifugal force.



4. When a moving bus stops suddenly, the passengers and the driver .....
   a. rush backward. b. rush forward.
   c. turn upside down. d. tend to lean.
5. 📖 When the horse is tripped, the horse rider is suddenly rushed forward, this is related to the force of .....
   a. inertia. b. centrifugal. c. gravitational. d. horse pushing.
6. Passengers are rushed back when a car starts moving suddenly, this is related to .....
   a. centrifugal force. b. force of gravitational.
   c. force of inertia. d. friction force.
7. All of the following are examples of inertia except .....
   a. once the car starts moving forward, the passengers are rushed back.
   b. passengers are rushed forward if the moving car stops suddenly.
   c. if a football player is tripped during running forward, he will be rushed forward.
   d. the gravitational of bodies to the Earth.
8. ..... is a technological application on inertia forces.
   a. Car tyres b. Contraction and relaxation of muscles
   c. Safety belts d. No correct answer
9. Electric fan still works for few seconds after cutting the electric current due to ..... force.
   a. electromagnetic b. gravitational c. inertia d. friction
10. Friction is always .....
    a. in the same direction of motion. b. against motion.
    c. perpendicular to the motion. d. parallel to the motion in any direction.

11. 📖 The car brake performance is an application of .....
a. gravitational forces. b. friction forces.
c. centrifugal forces. d. forces of inertia.

12. 📖 The following forces are applications of friction except .....
a. walking on the road. b. car motion due to rotation of its wheel.
c. operation of dynamo (electric generator). d. stopping the car using the brakes.

13. When using the bicycle brakes, ...
a. the speed of the bicycle decreases. b. the friction force decreases.
c. the centrifugal force increases. d. the force of inertia decreases.

14. Friction causes a great loss of mechanical energy because this energy is changed into ..... energy.
a. light b. electric c. heat d. magnetic

15. The idea of machines lubrication depends on the decrease in .....
a. their weights. b. forces of inertia. c. friction forces. d. forces of gravity.

16. Car tyres are covered with a very coarse substance to .....
a. reduce the friction with the road. b. reduce the air resistance.
c. increase the gravitational of wheels to road. d. increase the friction with the road.

17. In which of the following examples, friction is considered a problem ? .....
a. Burning a match.
b. Preventing feet from slipping during walking.
c. Using brakes.
d. Rising the temperature of mechanical machine parts.

18. ..... enable living organisms to do their different biological operations.
a. Forces of inertia b. Friction forces
c. Centrifugal forces d. Forces inside living systems.

19. 📖 From the examples of forces inside living systems is/are .....
a. pulse inside blood vessels. b. inertia.
c. brakes. d. all the previous answers.

20. The heart muscle contraction and relaxation are inferred from .....
a. inhalation and exhalation processes. b. the pulse inside blood vessels.
c. the movement of food in digestive system. d. no correct answer.

21. Liquids transport through pores and the walls of cells from .....
a. outside to inside. b. inside to outside.
c. low concentration to high concentration.
d. high concentration to low concentration.

22. Water transports from soil to leaves of plant by the effect of .....
a. gravitational forces. b. biological forces.
c. forces of inertia. d. friction forces.

UNIT 2

2. Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Stopping the bicycle after using brakes	a. due to force of inertia.
2. Contraction and relaxation of muscles	b. is one of the forces inside the living systems.
3. A football player is rushed forward and falls if he is tripped during running.	c. due to force of gravitational.
	d. due to friction.

3. Put (✓) or (✗) in front of the following statements and correct the wrong ones :

1. When the speed of a car is 50 km/hour, the speed of the driver is zero. ( )
2. Passengers are rushed backward when a car stops suddenly. ( )
3. Friction is a property of an object has to resist the change of its state. ( )
4. Safety belts in cars work on increasing the forces of inertia. ( )
5. Slowing down of a moving bicycle on a road by brakes is due to its inertia. ( )
6. Friction always opposes motion. ( )
7. Friction prevents feet from slipping on roads during walking. ( )
8. Friction causes a great loss of electric energy because this energy is changed into heat energy. ( )
9. Car tyres are covered with a very smooth substance to increase the friction with roads. ( )
10. Lubricants and oils have no effect on friction. ( )
11. Friction may occur between the surface of a solid object and air. ( )
12. Car brakes are from applications on friction forces. ( )
13. There are forces inside living systems including single-cellular organisms. ( )
14. Heart muscle contraction and relaxation is one of the forces inside living systems. ( )
15. There are forces inside amoeba to keep it survival. ( )
16. Contraction and relaxation of body muscles help in moving. ( )
17. Liquids transport through pores and the walls of cells from the higher concentration to the lower one. ( )

4. Write the scientific term of each of the following :

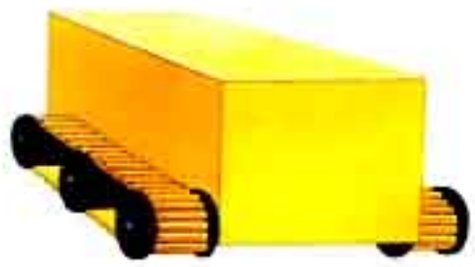
1. It is a property of an object has to resist the change of its state of rest or motion at a regular speed in a straight line unless an external force acted on it.
2. A technological application is used in cars and planes to stop the forces of inertia when a sudden change in motion occurs.
3. Resistant forces (against motion) originate between the object in motion and the medium touching it.
4. Forces help in moving and stopping car and bus.
5. Forces that help living organisms to do its biological operations.

5. Complete the following statements :

1. ..... and ..... are among the accompanied forces to motion.
2. Passengers and the driver in a moving car are ..... once the car suddenly stops due to the .....
3. Passengers are ..... once the vehicle starts moving forward after it was at rest.
4. If a football player is tripped during running forward, he will be ..... and ..... on the ground.
5. Any object inside a moving bus has the same ..... of the bus so, when the bus stops suddenly, objects fall on the ground due to the force of .....
6. Policemen advise drivers using ..... in cars and planes, as they act on stopping the forces of .....
7. ..... forces are resistant forces originated between a moving object and the medium touching it.
8. ..... force prevents feet from slipping on roads during .....
9. Friction causes a great loss of ..... energy because this energy is changed into ..... energy.
10. Lubricating and oiling mechanical machines reduce the ..... between moving parts and prevent their .....
11. ..... and ..... are from the benefits of friction.
12. The uni-cellular organisms are from ..... living systems, while multi-cellular organisms are from ..... living systems.
13. Heart muscle ..... and ..... help heart to pump blood all over the body.
14. Liquids transport through the walls of the cells from the ..... concentration to the ..... concentration.
15. The contraction and ..... of muscles help the body organs to .....

6. Give reasons for :

1. 📖 The car passengers are rushed forward when the moving car stops suddenly.
2. 📖 The car passengers are rushed backward when the car moves suddenly.
3. The football player is rushed forward and falls if he is tripped during running forward.
4. 📖 Policemen advise drivers to use safety belts in cars and planes.
5. The fan is going to turn after the electric current goes off.
6. Once you use the brakes of a moving bicycle, its speed decreases gradually until it stops.
7. Cars that travel on snow have to carry chains that fit around the tyres.



8. When you drive a car in a city traffic for sometime, the brakes become hot.
9. You are able to run over grass much faster than you run over a ground covered with ice.

10. Car tyres are covered with a very coarse substance.
11. • Spare parts of cars are covered with grease.
    • Lubricating and oiling mechanical machines.
12. The match is ignited when it is rubbed with a rough surface.
13. The presence of oil stains on highways is very dangerous.
14. Friction forces are double edged weapon.
15. Blood is pumped all over the body organs.

7. What is meant by ...?

1. 📖 Inertia.
2. Friction.
3. Forces inside living systems.

8. What is the force responsible for each of the following :

1. Falling the coin inside the cup on pulling the paper placed on the top of a glass cup quickly.
2. Ease of the movement on asphalt and difficulty on the gravel.
3. Pulse inside the blood vessels.
4. The rise of water and salts from the soil to the leaves of plant.

9. What happens when ...?

1. A moving bus stops suddenly (concerning the driver and the passengers).
2. A car at rest and suddenly moves forward (concerning the driver and the passengers).
3. You hit quickly a paper placed over a glass cup and a coin placed over the paper.
4. The passengers don't use the safety belts in cars.
5. You ride a bike along a flat road, then you use brakes.
6. Mechanical machines are not lubricated.
7. Friction between two objects quickly (concerning their temperatures).
8. Contraction and relaxation of body muscles.
9. Stopping the movement of a heart muscle (concerning the pulse inside the blood vessels).

10. Various questions :

(1) Mention two examples indicating inertia in our life.

(2) Show by an activity the concept of inertia.

(3) 📖 Name three benefits and three harms of friction forces.

(4) Mention one application for each of the following :

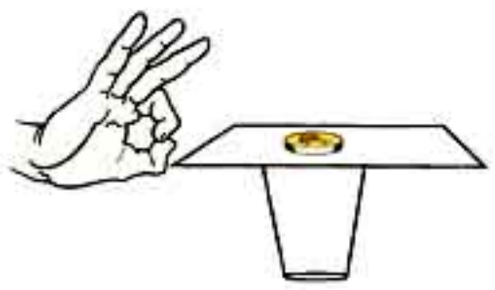
(1) Inertia.
(2) Useful friction forces.
(3) Harmful friction forces.

(5) Why do you slip when you walk on a wet land ? and this doesn't happen when the land is dry ?

(Describe what happens in both cases).

6 Mention three examples of forces inside living organisms.

7 **From the opposite figure**. Mention the reason for falling the metallic coin in the cup when pushing the paper quickly. What do you conclude from that ?



8 Adel and Dina draw a horizontal line at the top of a wooden inclined plane as shown in the figure.

Adel put his car at the drawn line and left it to move, the car travels 216 cm. When Dina does the same procedure, her car travels 242 cm. Answer the following :

(1) In which car, friction is larger ?

(2) Why do both cars stop ?

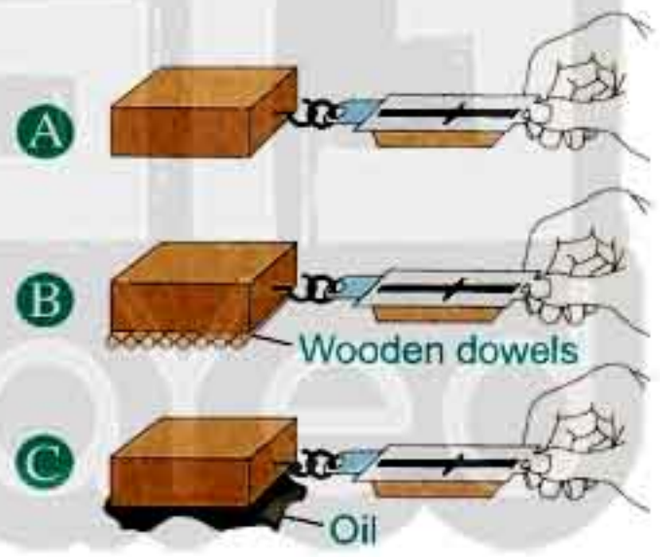
(3) If Dina puts some sand on the inclined plane and leaves her car to travel along it. On which plane does the car travel more slowly ? Why ?

9 **Look at the opposite figures, then answer the following questions :**

(1) Friction in (B) is ..... (greater/less) than in (A).

(2) With lubrication (Fig. (C)) you need .....
(more/less) force to move an object.

(3) Lubrication ..... (increases/decreases) friction.



11. The opposite figure shows a static object affected by a pulling force equals 120 newton for right and a friction force by Earth equals 150 newton for left.

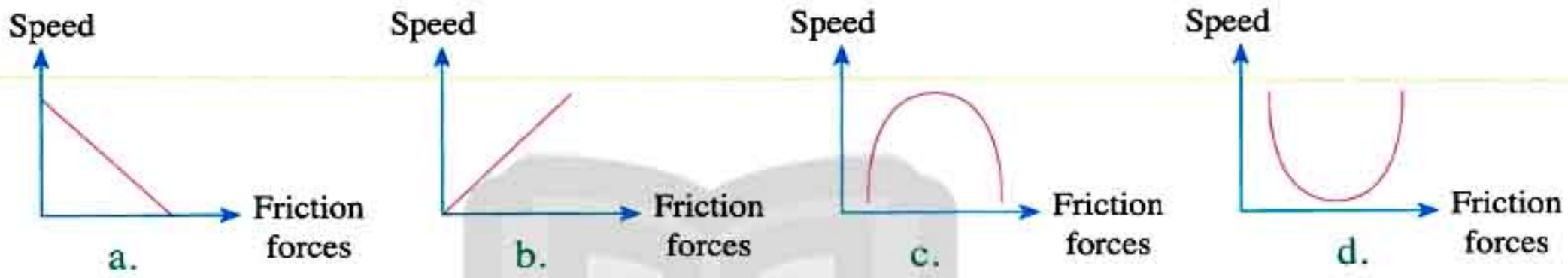
Answer the following questions :

1. Why doesn't the box move from its position ?

2. Why doesn't the box move to left although the value of friction force is more than the value of the pulling force ?

1. Choose the correct answer :

1. Figure ..... represents the relation between the friction forces and the speed of the object.



2. The friction force is less than the force that causes movement in case of .....
   a. putting a ladder based on a wall.
   b. using the brakes of a bike.
   c. walking along the way.
   d. all the previous answers.

2. Give reasons for :

1. It is difficult to pull the boat on the sand of beach and easily in water.
2. Rising the temperature of the outer surface of the spaceship body during landing in the Earth's atmosphere.
3. Continuous pouring water on the tyre of lathe toothed during cutting metals.

3. A part of a chicken intestine is filled with unknown concentration solution and put in a basin filled with another unknown concentration solution, after 30 minutes the intestine is inflated. Answer the following questions :

1. The concentration of solution (A) is ..... that of (B).
   a. more than
   b. equal to
   c. less than
2. Which of the two solutions has a concentration 10% and which one has 40% ? Give a reason.
3. What are you expected to happen to the intestine when transferred to a solution, its concentration is 70% ?
4. What are the forces that cause this ?

Questions
on lesson three

Questions signed by 📖 have been taken from the school book.

1. Choose the correct answer :

1. The change in an object's position or direction as the time passes relative to a frame of reference is called ..... motion.
   a. periodic b. vibrating c. relative d. circular
2. When two cars move in the same direction with a velocity 80 km/h., the driver of the first car imagines that the second car moves with velocity ..... km/h.
   a. zero b. 80 c. 160 d. no correct answer.
3. If you are in a moving train, you imagine that cars moving in the same direction on the road at smaller speed .....
   a. stop. b. move forward.
   c. move backward. d. move with a high speed.
4. The motion of the following objects are transitional motion except the motion of .....
   a. train. b. simple pendulum. c. car. d. bicycle.
5. 📖 In the periodic motion, the .....
   a. pathway is straight. b. motion is regularly repeated.
   c. mass is regularly repeated. d. speed is regularly changed.
6. The motion of a simple pendulum is considered ..... motion.
   a. vibrating b. circular c. wave d. transitional
7. The movement of the Moon around the Earth is considered ..... motion.
   a. vibrating b. circular c. wave d. transitional
8. 📖 All of the following are periodic motions except the .....
   a. movement of the Moon around the Earth. b. pendulum motion.
   c. train motion. d. sunflower motion.
9. All of the following are motions regularly repeated in equal periods of time except .....
   a. wave motion. b. circular motion.
   c. vibrating motion. d. transitional motion.
10. The movement of electrons around the nucleus is considered ..... motion.
    a. vibrating b. circular c. transitional d. wave
11. All of the following are properties of sound waves except .....
    a. it is mechanical waves.
    b. it is produced due to vibration of medium particles.
    c. it needs a medium to travel.
    d. it travels through free space.

UNIT 2

12. Sounds are produced due to .....
a. vibration of medium particles.
b. electromagnetic forces.
c. electrostatic forces.
d. wave motion.

13. Mechanical waves are characterized by .....
a. their speed is greater than that of electromagnetic waves.
b. their speed is 300 millions m/sec.
c. their need for a medium to propagate through.
d. (a) and (c).

14. ..... waves is an example of mechanical waves.
a. Water
b. Light
c. Radio
d. Ultraviolet

15. ..... are used in examining and curing sets for human body.
a. Ultrasonic waves
b. Gamma rays
c. Infrared rays
d. X-rays

16. 📖 All of the following are electromagnetic waves except for the .....
a. thermal (infrared) rays.
b. visible light.
c. sound waves.
d. ultraviolet rays.

17. We see lightning before hearing thunder because .....
a. lightning occurs before thunder.
b. sound needs a medium to travel through.
c. the speed of light is 340 m/sec.
d. the speed of light is much greater than that of sound.

18. The speed of both ..... in space equals 300 million m/sec.
a. sound and light
b. X-rays and gamma rays
c. infrared rays and water waves
d. ultraviolet rays and sound waves

19. All of the following are stringed musical instruments except .....
a. violin.
b. flute.
c. lute.
d. guitar.

20. Sound waves are used in all the following except .....
a. examining and curing sets.
b. making remote sets.
c. musical instruments.
d. amplifiers.

21. ..... are used in night vision apparatus.
a. Infrared rays
b. Ultraviolet rays
c. Gamma rays
d. X-rays

22. Infrared rays are used in cooking food because they have ..... effect property.
a. light
b. magnetic
c. heat
d. electric

23. Infrared rays are used in all of the following applications except in .....
a. night vision apparatus.
b. cooking food.
c. making remote sets.
d. sterilization.

24. X-rays are used in .....
   a. treatment and discovering some swellings.
   b. photographing bones to detect bone fractures.
   c. sterilizing the sets of surgical operation rooms.
   d. remote sensing instruments to photograph the Earth's surface.

25. ..... are used in examining mineral raws in industry.
   a. X-rays b. Ultraviolet rays
   c. Infrared rays d. Gamma rays

26. ..... are used in medical purposes as the treatment and discovering some swellings.
   a. X-rays b. Ultraviolet rays
   c. Infrared rays d. Gamma rays

27. ..... is among the applications of ultraviolet rays.
   a. Photographing bones b. Night vision apparatus
   c. Sterilizing of the sets of surgical operation rooms
   d. Discovering of some swellings

28. Visible light is used in all of the following applications except in .....
   a. night vision apparatus. b. television cameras.
   c. photographic cameras. d. data shows.

29. The speed of waves of X-rays in space is ..... the speed of waves of infrared rays.
   a. doubled b. less than c. more than d. equal to

2. Choose from column (B) what suits it in column (A) :

(A) Electromagnetic waves	(B) Technological application
1. Gamma rays	a. studying the inner structure of minerals crystals.
2. X-rays	b. treatment of some swellings.
3. Visible light	c. night vision apparatus.
4. Infrared rays	d. photography.
5. Ultraviolet rays	e. sterilize the sets of surgical operations rooms.
	f. wireless communications.

3. Put (✓) or (✗) in front of the following statements and correct the wrong ones :

1. When your car moves at a higher speed and another car which moves in the same direction passes, you will imagine that the other car goes forward. ( )
2. When you are in a moving car and another car moves beside you in the same direction at the same speed, you will imagine that the two cars don't move. ( )

UNIT 2

3. The motion of a boy from his house to the school is a periodic motion. ( )
4. The fixed point that is used to determine the position of objects is known as the reference point. ( )
5. Motion is divided into two types, which are circular motion and transitional motion. ( )
6. Periodic motion is changed between initial and final positions. ( )
7. Simple pendulum motion is a wave motion. ( )
8. The movement of the Moon around the Earth is a circular motion. ( )
9. Water waves motion is a periodic motion. ( )
10. Transitional motion differs from periodic motion as it has initial and final points and it doesn't repeat its motion. ( )
11. Water waves are electromagnetic waves. ( )
12. Sound waves are produced due to the vibration of medium particles. ( )
13. Electromagnetic waves are accompanied by gravitational forces. ( )
14. Ultraviolet rays are used in examining and curing sets for the human body. ( )
15. Sound waves are used in pneumatic musical instruments, such as violin and guitar. ( )
16. Ultraviolet rays are used in making remote sets and in night vision apparatus. ( )
17. X-rays are used in cooking food as they have heat effect property. ( )
18. Infrared rays are used in sterilizing the sets of surgical operations rooms. ( )
19. Gamma rays are used in photographing bones. ( )
20. X-rays are used in examining mineral raws in industry. ( )
21. Gamma rays are used in treatment and discovering some swellings. ( )
22. We use infrared rays in light shows. ( )

4. Write the scientific term of each of the following :

1. The distance covered by an object in a unit time.
2. It is the change of an object's position or direction as time passes relative to a fixed point.
3. A fixed point used to determine the object's position or to describe its movement.
4. It is the motion of an object in which its position changed relative to a fixed point from initial to final positions.
5. An object's position changes as time passes from its initial position to a different final one.
6. The motion which is regularly repeated in equal periods of time.
7. A kind of motion, which is produced by a simple pendulum.
8. A kind of motion, which is produced from the movement of the Moon around the Earth.
9. A kind of motion by which sound and light are transferred from one place to another.
10. Waves produced due to the vibration of medium particles.

11. Waves which need a medium, such as air to transfer through.
12. Waves which don't need a medium to travel through.
13. Waves which are accompanied by electromagnetic forces.
14. Electromagnetic rays have a thermal effect.

5. Complete the following statements :

1. Relative motion is the change in an object ..... or ..... as the time passes relative to another object or a fixed point known as .....
2. When two cars move in the same direction at the same speed, drivers imagine that the two cars ..... moving and no motion will be observed.
3. If car (A) moves at a higher speed than car (B), the driver in car (A) will see in the mirror that car (B) moves in ..... direction.
4. Types of motion are ..... motion and ..... motion.
5. Transitional motion is the motion in which the object's ..... is changed from time to time relative to a fixed frame of reference from ..... position to another ..... one.
6. The movement of the Moon around the Earth is a ..... motion, while that of the bicycle and the train is a ..... motion.
7. Transitional motion is not considered as periodic motion because it has ..... and ..... points and it doesn't ..... its motion.
8. ..... motion is a motion which is regularly repeated in ..... periods of time.
9. ..... , ... and ..... are examples of periodic motion.
10. The motion of simple pendulum is considered ..... motion, while that is produced from throwing a stone in water is considered ..... motion and both are considered as forms of ..... motion.
11. Waves are divided into two kinds, which are ..... waves and ..... waves.
12. Sound waves and ..... waves are examples of ..... waves.
13. Mechanical (sound) waves don't transfer through ..... but they need a ..... like air to transfer through.
14. Mechanical waves are produced due to the ..... of the medium .....
15. Electromagnetic waves don't need a ..... to travel through, so they can travel through .....
16. Water wave is an example of ..... waves, while light wave is an example of ..... waves.
17. Electromagnetic waves are accompanied by ..... forces.
18. ..... and ..... rays are emitted from the Sun.
19. ..... , ... and ..... are examples of electromagnetic waves.

UNIT 2

20. Thunder sound transfers in a form of ..... waves, whereas lightning flash transfers in a form of ..... waves.
21. We see lightning before hearing thunder , because the speed of sound is ..... than the speed of light.
22. Light waves can spread out in all media and ..... with a speed of ..... m/sec.
23. The violin and the guitar are among ..... musical instruments, while ..... and reed pipe are among ..... musical instruments.
24. ..... rays are used in night vision apparatus, while ..... rays are used in photographic cameras.
25. ..... rays are used in sterilizing the sets of surgical operations rooms, while ..... rays are used in discovering some swellings.
26. ..... rays are used in cooking food as they have ..... effect.
27. ..... and ..... are among the applications of X-rays.
28. Visible light is used in ..... , TV cameras and in .....
29. ..... rays are used in remote sensing instruments.

6. Give reasons for :

1. The movement of trees and buildings related to a person in a moving car is considered a relative motion.
2. A train motion is a transitional motion.
3. • Vibrating motion is a periodic motion.
   • Circular motion is a periodic motion.
   • The motion of the pendulum is a periodic motion.
4. Transitional motion differs from periodic motion.
5. 📖 We receive the sunlight at the same time we don't hear the sound of solar explosions.
6. 📖 Astronauts can't hear each other voices directly in space.
7. We see lightning before hearing thunder although they occur at the same time.
8. Sound needs a medium to travel through, while light travels through space.
9. Sound and water waves are mechanical waves.
10. Remote sets don't need a medium to control operating the electrical appliances.
11. Infrared rays are used in cooking.
12. X-rays are used in photographing bones.
13. X-rays are used in examining mineral raws in industry.
14. Gamma rays have medical purposes.
15. Exposing dental treatment tools for ultraviolet rays before reuse.

7. Define each of the following :

1. 🕮 Speed.
2. 🕮 Relative motion.
3. Mechanical waves.
4. Electromagnetic waves.
5. 🕮 Periodic motion.
6. 🕮 Transitional motion.

8. What happens when ... ?

1. Two objects move at the same speed and in the same direction.
2. A car next to your stopping car moves backward suddenly.
3. A car next to your stopping car moves forward suddenly.

9. Give an example indicating each of the following :

1. Relative motion.
2. Transitional motion.
3. Vibrating motion.
4. Circular motion.
5. Wave motion.
6. Mechanical waves.
7. Electromagnetic waves.
8. Rays emitted from the Sun.
9. Stringed musical instruments.
10. Pneumatic musical instruments.
11. Rays have heat effect property.

10. Choose the odd word out (mention the reason for your choice) :

1. A person motion / A simple pendulum motion / A car motion / A train motion.
2. The movement of the rotary swing / The movement of the electrons around the nucleus / The movement of the Moon around the Earth / The movement of a piece of cork on the surface of shaking water.
3. Transitional motion / Vibrating motion / Circular motion / Wave motion.
4. Radio waves / Microwaves / Water waves / X-rays.
5. Light waves / Sound waves / Water waves.

11. Mention the name of rays (or waves) which are used in each of the following :

1. Medical examining.
2. Examining and curing sets for the human body.
3. Remote sensing instrument to photograph the Earth's surface using satellites.
4. Cooking food.
5. Making remote sets to control and operate electric sets.
6. Sterilizing the sets of surgical operations rooms.
7. Photographing bones to detect the sites of bone fractures.
8. Examining mineral raws in industry.
9. Treatment and discovering some swellings.
10. Photographic cameras.
11. Television cameras and light shows.

UNIT 2

12. Mention one application of each of the following rays :

1. Sound waves.
2. Infrared rays.
3. Ultraviolet rays.
4. X-rays.
5. Gamma rays.
6. Visible light.

13. Compare between :

1. Transitional motion and periodic motion. [Give examples of each of them].
2. • Mechanical waves and electromagnetic waves.
   • Light waves and sound waves.
3. Train motion and fan arms motion.
4. Simple pendulum motion and water waves motion.

14. Various questions :

1 Mention three examples of the transitional motion.
2 Mention three examples of the periodic motion.
3 Mention two examples of each of the mechanical waves and electromagnetic waves.
4 Mention three kinds of electromagnetic waves used in photographing field.

15. Mention the type of motion represented by each figure :

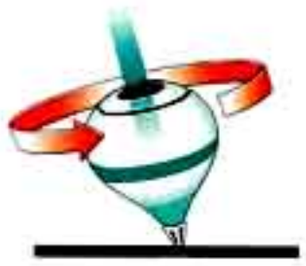
(1)

(2)

(3)

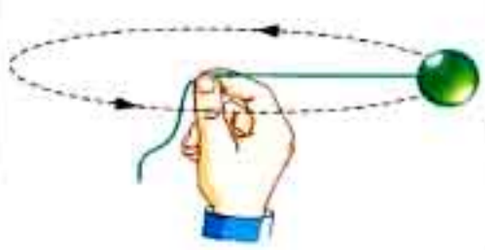
(4)

(5)



(6)

(7)



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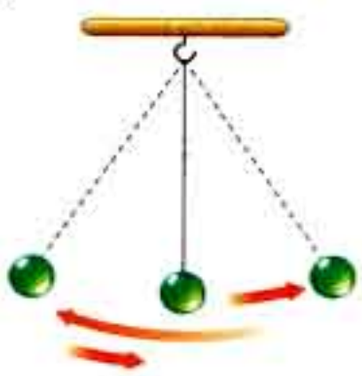
(9)



1. If a bicycle moves for 15 minutes.

a. between two points.

b. in a circle around a certain point several times.

Which of these motions is periodic motion and which is transitional motion ? Why?

2. When watching a football match at the stadium, the voice of the internal broadcaster was heard from the radio before hearing his voice from the internal radio in the stadium Explain why.

3. Describe the motion of each of the following objects :

1. A car moves beside your car in the same direction at the same speed.
2. Your car moves beside a stopping car.
3. A car moves beside your car in the opposite direction.
4. A train moves from Alex. to Cairo.
5. Sunflower plant.

UNIT ONE

Lesson 3 Chemical Equations & Reactions

Worksheet 6

1. **A. In the following reaction :**

$$2Mg + O_2 \xrightarrow{\Delta} 2MgO$$

1. The ..... bond in oxygen molecule is broken to give ..... atoms.
2. Magnesium atom conbines with ..... atom to form ..... molecule.
3. Given that the mass of (Mg) = 24 and that of (O) = 16

Calculte the total mass of the products.

.....

B. Rewrite the following chemical equations after balancing them :

1. $N_2 + H_2 \longrightarrow NH_3$

.....

2. $Ca + O_2 \longrightarrow CaO$

.....

3. $KI + Cl_2 \longrightarrow 2KCl + I_2$

.....

2. **Give reasons for :**

1. On burning a magnesium ribbon in air, a white powder is formed.

.....

.....

2. The chemical equation should be balanced.

.....

3. **What is meant by ... ?**

1. Chemical reaction : .....

.....

2. Law of constant ratios : .....

.....

4. **Express the reaction of hydrogen with oxygen to form water by balanced symbolic and word equations with achieving the law of conservation of matter.**
[knowing that the atomic mass of H = 1 and O = 16]

.....

.....

.....

Worksheet 7

1. What happens in each of the following :
[Explain your answer with balanced chemical equation] :

1. Putting a glass rod wet with conc. hydrochloric acid close to the opening of a test tube containing ammonia solution.

.....

.....

2. Burning a piece of coal in air.

.....

.....

2. A. Write the scientific term :

1. Reactions which involve combination between a compound with another or an element with another. [.....]
2. Oxides that cause building corrosion. [.....]
3. The gas which acts as a greenhouse effect. [.....]

B. Write a short paragraph on greenhouse phenomenon.

.....

.....

.....

3. Give reasons for :

1. Lightning causes environmental pollution.

.....

2. Risk of nitrogen oxides on human health.

.....

4. Compare between carbon oxides and sulphur oxides [Concerning : Examples - The negative effect] :

Points of comparison	Carbon oxides	Sulphur oxides
1. Examples :	....	....
2. Negative effect :	....	....

UNIT TWO Force and Motion

Lesson 1 Fundamental Forces in Nature

Worksheet 8

1. A. What is meant by ... ?

1. Force : .....

.....

2. Object's weight : .....

B. Complete the following statements :

1. When a racket hits the tennis ball, a ..... acting on the ball causing the change of its .....
2. ..... , electromagnetic forces, and ..... are the main three divisions of forces in the nature.

2. A. Choose the correct answer :

1. All of the following are examples for some fundamental phenomena except .....
   a. nuclear explosions. b. wind motion. c. water motion. d. lightning.
2. ..... is the measuring unit of the force.
   a. Newton b. Metre c. Kilogram d. Coulomb
3. All of the following are from the effects of the force except .....
   a. moving a static object.
   b. changing the direction of a moving object.
   c. changing object's mass.
   d. increasing the speed of a moving object.

B. Give reasons for :

1. Object weight changes from one place to another on the Earth's surface.

.....

2. When you push a wall, it doesn't move.

.....

3. A. 1. Calculate the weight of an object of 5 kg mass [Knowing that the acceleration due to gravity is 10 m/sec^2].

.....

.....

PART 1

2. Calculate the mass of a child, its weight is 392 newton. [knowing that the acceleration due to gravity is 9.8 m/ sec^2].

.....

B. Put (✓) or (✗) :

1. Object's weight is a fixed value, while the object's mass changes from a place to another on the Earth's surface. ( )
2. The exerted work to lift an object increases by increasing the object's mass. ( )
3. The mass of a person at the equator is less than that its mass at the two poles. ( )

4. What happens in the following cases ... ?

1. When the object's mass increases (concerning the object's weight).

.....

2. When you kick a static ball by your foot.

.....

Worksheet 9

1. Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Electric motor. 2. Electromagnet. 3. Electric generator.	a. changes the mechanical energy into electric energy. b. changes the electric energy into mechanical energy. c. changes the electric energy into magnetic energy.

1. ..... 2. ..... 3. .....

2. By using the following materials. How can you prove that electric current has a magnetic effect.

Dry battery

Pins

Nail of wrought iron

Isolated copper wire

Plastic tube

Steps : .....

.....

.....

Observation : .....

Conclusion : .....

3. **A. Complete the following :**

1. Egypt seeks to use ..... energy in producing electricity.
2. The nuclear forces can be divided into ..... and .....
3. An atom stores a massive amount of energy inside its .....
4. The fan and electric mixer are from devices that change ..... energy into ..... energy.

B. What is the importance of ... ?

1. Strong nuclear forces : .....

.....

2. Weak nuclear forces : .....

.....

4. **What are the forces responsible for each of the following :**

1. Falling of objects towards the Earth's surface. [.....]
2. Changing the mechanical energy into electric energy. [.....]
3. Producing electricity from nuclear energy. [.....]
4. The emission of some invisible radiations from radioactive elements. [.....]

UNIT TWO

Lesson 2 Accompanied Forces to Motion

Worksheet 10

1. A. Complete the following :

1. ..... and ..... are from the accompanied forces to motion.
2. Passengers are ..... once the vehicle moves forward suddenly after it was at rest due to ..... force.

B. Choose the correct answer :

1. When the horse is tripped, the horse rider is suddenly rushed forward, this is related to the force of .....

   a. inertia. b. centrifugal. c. gravitational. d. horse pushing.

2. ..... is a technological application on inertia.

   a. Car tyres b. Safety belts

   c. Pulse inside blood vessels d. Cars' brakes

2. Which of the two figures represent stopping the bus suddenly and moving the bus suddenly (Give a reason) :

Fig. (1)

Fig. (2)

.....

.....

.....

.....

3. A. What is meant by inertia ?

.....

.....

B. Put (✓) or (✗) , then correct the wrong ones :

1. Force is a property of an object has to resist the change of its state.

   ( ) .....

2. The football player is rushed forward and falls down if he is tripped during running.

   ( ) .....

4. Give reasons for :

1. The car passengers are rushed forward when the moving car stops suddenly.

.....

2. Policemen advise drivers to use safety belts in cars.

.....

3. The person falls on his face if he collides with a stone while running.

.....

.....

Worksheet 11

1. A. What is meant by friction force ?

.....

.....

B. Put (✓) or (✗) , then correct the wrong ones :

1. Heart muscle contraction and relaxation helps the heart to pump blood all over the body organs.

( ) .....

2. Liquids transport through pores and the walls of cells from the higher concentration to the lower one.

( ) .....

3. Asphalt is more rough in curved roads to reduce friction forces.

( ) .....

2. Mention :

A. Three benefits of friction :

.....

.....

.....

B. Three of the biological operations related to the forces inside living systems :

.....

.....

.....

3. Give reasons for :

1. Lubricating and oiling of mechanical machines.

.....

2. Car tyres are covered with a very coarse substance.

.....

PART 1

Worksheet 12 on Lessons 1 & 2

1. **Correct the underlined words :**

1. The idea of lubricating machines depends on reducing its **speed**. [.....]

2. Electromagnet is used in making **the calculator**. [.....]

3. The liquids transport through pores and the walls of cells from the lower concentration to higher one by the effect of **inertia forces**. [.....]

4. Egypt seeks to use **mechanical energy** in producing electricity. [.....]

5. Car brakes are from applications on **Earth's gravitational** forces. [.....]

2. **Mention three harms of friction :**

.....

.....

.....

3. **A. Write the scientific term :**

1. The product of multiplying object's mass by Earth's gravitational acceleration.

[.....]

2. Resistant forces originate between the object in motion and the medium touching it.

[.....]

3. An instrument used to change the mechanical energy into electric energy.

[.....]

B. If the Earth's gravitational acceleration at the Earth's surface is 9.8 m/sec^2 and it becomes 9.2 m/sec^2 at a height of 200 km above the Earth's surface level. Calculate the amount of decrease in the weight of a person, its mass is 75 kg at this height.

.....

.....

.....

4. A. Complete the following :

1. Policemen advise drivers to use ..... in cars and planes, as they act on stopping the forces of .....
2. Electromagnet changes ..... energy into ..... energy.
3. Liquids transport through the walls of the cells from the ..... concentration to the ..... concentration.

B. What happens when .... ?

1. Migration of a bird from the south pole to the equator (related to : the mass and the weight of the bird).

.....

.....

2. A moving bus stops suddenly (concerning the driver and the passengers)

.....

.....

.....

UNIT TWO

Lesson 3 Motion

Worksheet 13

1. **A. Give one example for :**

1. Circular motion : .....
2. Wave motion : .....
3. Vibrating motion : .....

B. Choose the correct answer :

1. In the periodic motion, the .....
   a. pathway is straight.
   b. motion is regularly repeated.
   c. time is regularly repeated.
   d. speed is regularly changed.
2. All of the following are periodic motions except the .....
   a. movement of the Moon around the Earth.
   b. pendulum motion.
   c. train motion.
   d. sunflower motion.

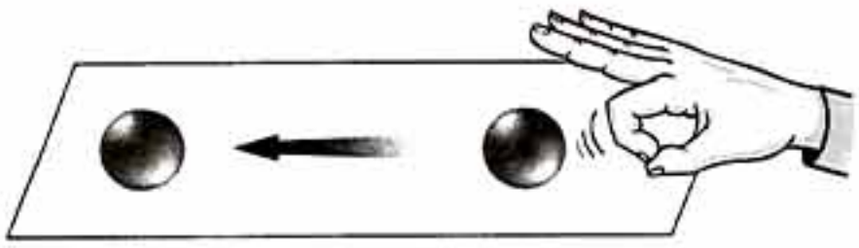
2. **Define each of the following :**

1. Periodic motion : .....
   .....
2. Relative motion : .....
   .....
3. Transitional motion : .....
   .....

3. **Complete the following statements :**

1. ..... and ..... are from the examples of transitional motion.
2. If you are in a stopping car and another car moves forward beside you, you will imagine that your car moves in ..... direction.
3. Types of motion are ..... motion and ..... motion.

4. Mention the type of motion represented by each figure :



.....
(1)

.....
(2)

.....
(3)

.....
(4)

Worksheet 14

1. Compare between mechanical waves and electromagnetic waves (giving examples) :

Mechanical waves	Electromagnetic waves
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

2. A. Complete the following statements :

1. ..... and ..... rays are emitted from the Sun.
2. The waves causing the wave motion are divided into two types which are ..... and .....

B. Put (✓) or (✗) :

1. Flute and lute are examples of pneumatic musical instruments. ( )
2. Gamma rays, X-rays and ultraviolet rays are used in medical purposes. ( )

PART 1

3. Give reasons for :

1. We see lightning before hearing thunder.

.....

2. We receive the sunlight and we don't hear the sound of solar explosions.

.....

.....

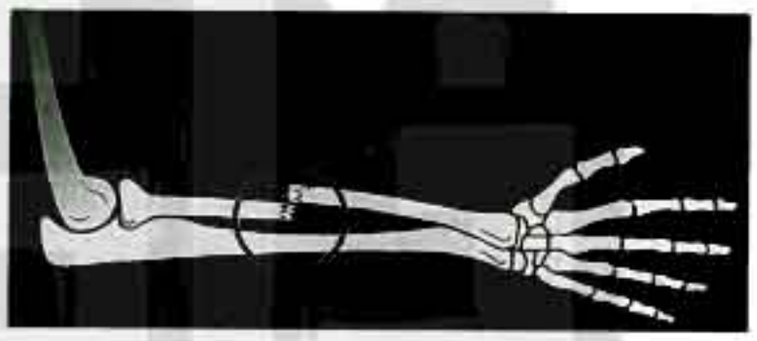
3. Astronauts can't hear each other voices directly in the space.

.....

4. A. Mention one application for the electromagnetic waves used in the following fields :

1. Medical field : .....
2. Photography field: .....
3. Heat field : .....
4. Remote sensing field : .....

B. The opposite figure shows a fracture in the bones of one arm :



1. Mention the name of the waves used for this type of photography, then mention another technological application for these waves.

.....

2. What is the difference between these waves and sound waves ?

.....

.....

General Exercise of the School Book on Unit TWO

Question 1

Choose the correct answer :

1. A force is an effect .....
   a. always changes the state of an object motion.
   b. never changes the state of an object motion.
   c. always changes an object position and direction.
   d. may change the state of an object motion.
2. An object's weight on the Earth's surface is related to ..... forces.
   a. electromagnetic b. gravitational c. weak nuclear d. strong nuclear
3. The amount of Earth's gravitational pull on the object is .....
   a. object's mass. b. object's weight.
   c. gravitational acceleration. d. centrifugal force.
4. Electromagnetic forces affect on the operation of the following except for .....
   a. dynamo (electric generator). b. electric motor.
   c. car internal combustion engine. d. electromagnet.
5. When the horse is tripped, the horse rider is suddenly pushed forward, this is related to the force of .....
   a. inertia. b. centrifugal.
   c. gravitational. d. the horse pushing.
6. The following forces and operations are an application on friction except for .....
   a. walking on the road.
   b. car motion due to rotation of its wheel.
   c. operation of dynamo (electric generator).
   d. stopping the car using the brakes.
7. All of the following are periodic motions except for .....
   a. the movement of the Moon around the Earth. b. the pendulum motion.
   c. the projectiles motion. d. the light waves.
8. All of the following are electromagnetic waves except for the .....
   a. thermal (infrared) rays. b. visible light.
   c. sound waves. d. ultraviolet rays.

PART 1

Question 2

A What is meant by ... ?

1. Relative motion.

.....

.....

2. Periodic motion.

.....

.....

3. An object's weight is 60 N.

.....

.....

4. Inertia.

.....

.....

B Give reasons for :

1. Gravitational acceleration is changed on Earth's surface from a place to another.

.....

2. An object's weight is changed from a place to another.

.....

3. When a car stops suddenly, passengers are rushed forward.

.....

C Give the scientific term :

1. An object's position changes as time passes from its initial position to a different final one. [.....]

2. The amount of Earth's gravitational pull on an object. [.....]

Model Exams on Unit TWO

Model Exam 1

20

Answer the following questions :

Question 1 — 5 marks

A The opposite figure shows the idea of working of a device :

1. What is the name of this device ?

.....

2. What is the changes of energy in this device ?

.....

3. What happens when you disconnected one end of the wire from the battery ? What do you conclude ?

.....

B Choose the correct answer :

1. The movement of sound and light waves is ..... motion.

a. transitional b. vibrating c. circular d. wave

2. From harms of friction forces is .....

a. stopping the car when using the brakes.

b. landing slowly when using parachut.

c. rising of blood in veins against gravity.

d. increasing the temperature of gears of machines when operated a long time.

Question 2 — 5 marks

A Complete the following :

1. Friction is a resistant force originated between ..... and .....

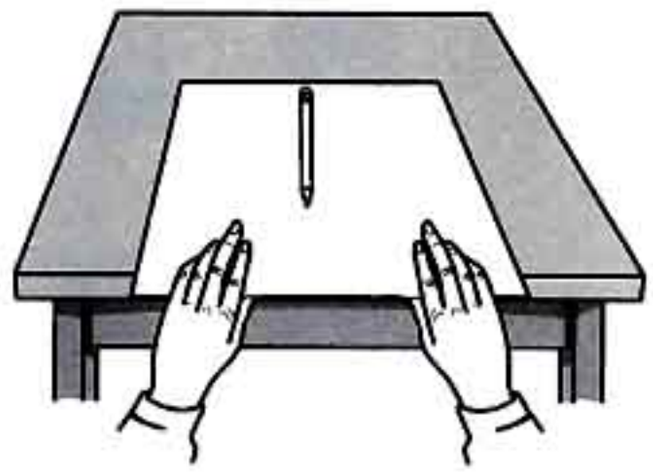
2. When an object transfers from the equator to the north pole, ... is changed, while ..... remains fixed.

3. The violin and the guitar are among ..... musical instruments, while flute and reed pipe are among ..... musical instruments.

PART 1

B In the opposite figure :

What happens to the pen when pulling the paper quickly ?
(Give a reason)



.....

.....

Question 3 *5 marks*

A Write the scientific term :

1. The effect that attempts to change the object's state from being static to motion or vice versa. [.....]
2. Waves produced due to the vibration of medium particles. [.....]

B Give reasons for :

1. Infrared rays are used in cooking food.

.....

2. Importance of nuclear force.

.....

3. Spare parts of cars are covered with grease.

.....

Question 4 *5 marks*

A Choose from column (B) what suits it in column (A) :

(A)	(B)
Type of motion	**Example**
1. Vibrating motion	a. motion of sound waves.
2. Circular motion	b. motion of a train from station to another.
3. Wave motion	c. movement of the Moon around the Earth.
	d. motion of the simple pednulum.

1. ..... 2. ..... 3. .....

B Put (✓) or (✗) :

1. Ultraviolet rays are used in examining mineral raws in industry. ( )
2. Dynamo changes the heat energy into electric energy. ( )
3. Passengers are rushed forward when the moving car stops suddenly. ( )
4. Earth's gravitational acceleration increases by approaching to the Earth's centre. ( )

Model Exam 2

20

Answer the following questions :

Question 1 — 5 marks

A What is meant by ... ?

1. Mechanical waves : .....
.....
2. Inertia : .....
.....
3. An object's weight is 80 N : .....
.....

B Mention one use of each of the following :

1. Electric winches : .....
2. Weak nuclear force : .....
3. Gamma rays : .....
4. Visible light : .....

Question 2 — 5 marks

A Explain an activity to show the meaning of inertia practically.

.....
.....
.....
.....
.....

B Choose the correct answer :

1. If you know that the Earth's gravitational acceleration is 9.8 m/sec^2, so the weight of an object its mass is 70 kg on Earth equals ..... newton.

a. 5.88 b. 58.8 c. 686 d. 885

PART 1

2. ..... is the scientist who discovered the Earth's gravitational.

a. Planck b. Newton c. Archimeds d. Coulomb

Question 3 — 5 marks

A Give reasons for :

1. Sound needs a medium to travel through , while light travels through space.

.....

.....

2. Blood is pumped all over the body organs.

.....

B Put (✓) or (✗) , then correct the wrong one :

1. The mass of a person at the equator is less than its mass at the two poles.

( ) .....

2. Brakes are from examples of forces inside living systems.

( ) .....

3. Object's weight = its mass + gravitational acceleration.

( ) .....

Question 4 — 5 marks

Compare between (two points only) :

1. Transitional motion and periodic motion.

Transitional motion	Periodic motion
.....	.....
.....	.....
.....	.....
.....	.....

2. Sound waves and light waves.

Sound waves	Light waves
.....	.....
.....	.....
.....	.....
.....	.....